

# Species-rich forests offer stable carbon capture

Teak, eucalyptus plantations had 43% and 55% less carbon storage than natural forests, respectively

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Spending over six months conducting surveys inside Anamalai Tiger Reserve and using satellite data from multiple locations in the Western Ghats, an international team of researchers has shown that carbon storage was highest in species-rich evergreen forest. The paper published in *Environmental Research Letters* adds that the rate of carbon capture was more stable across years in forests than in plantations, and carbon capture by forests was more resilient to drought.

## Varied terrain

The study was done in natural evergreen and deciduous forests, and in teak and eucalyptus plantations. The studied eucalyptus plantations had comparatively lower carbon storage, while teak plantations stored nearly as much carbon as deciduous forests.

The team identified the trees, measured their girth and height in 250 square

plots inside the Anamalai Tiger Reserve, and used the measurements to estimate carbon storage in different forests and plantation types. They then used satellite data from Parambikulam Tiger Reserve, Rajiv Gandhi Tiger Reserve, Wayanad Wildlife Sanctuary and Bhadra Tiger Reserve, along with Anamalai to assess the rate of carbon capture and how they varied across years (2000-2018). All the study areas used to be exploited for timber and for raising plantations of commercially important trees in the past, but are now strictly protected as wildlife reserves. Annual rainfall and stressors like drought were all taken into consideration for the study.

The results showed that the species-rich evergreen forests stored carbon at approximately 300 tons per hectare. The storage in teak and eucalyptus plantations was 43% and 55% less, respectively. The researchers also found that the rates of carbon capture remained nearly the same year after



**Carbon sink:** The team found that species-rich evergreen forests stored carbon at approximately 300 tons per hectare. ■ ANAND OSURI

year in natural forests compared with plantations.

“This study can help transform reforestation policies. Currently, according to government data, over half of compensatory afforestation plantations use five species or less, which is way lower than in natural forests and totally inadequate. We know that this is not good for biodiversity, and now this study has shown that it is not great for the stability of carbon capture too,” explains one of the authors, T.R. Shankar Raman from

the Nature Conservation Foundation in Mysuru.

He adds that we also need to think about where the afforestation measures are being carried out. Grasslands help in carbon capture themselves and planting trees there can cause more harm than good.

## Long-term effects

The first author of the paper Dr. Anand Osuri says: “Our findings suggest that protecting and regenerating natural forests comprising a diverse mix of native tree

species is more reliable in the long term than raising monoculture or species-poor plantations as a strategy for mitigating climate change.” He was a postdoctoral scientist at Columbia University during the study and is presently a scientist with Nature Conservation Foundation.

Ruth DeFries, one of the authors from Columbia University, US adds: “Species-rich forests are beneficial for biodiversity as they also provide habitat to many other components – insects, birds, etc. Previous studies have shown that species-rich forests are also resistant to diseases.”

Keeping the Australian fires in mind, when asked if species-rich forests have better resistance to fire, she said that different trees have varying degrees of fire resistance depending on the thickness of the bark. Also, the ability to regenerate the seeds differ across species and so a multi-species forest would likely show greater resilience in case of a fire.